

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of)
)
Revision of the Commission's Rules) CC Docket No. 94-102
To Ensure Compatibility with) RM-8143
Enhanced 911 Emergency Calling Systems)

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COMMENTS OF OMNIPPOINT COMMUNICATIONS, INC.

Omnipoint Communications, Inc. ("Omnipoint"), by its attorneys, files these comments in response to the Commission's Further Notice of Proposed Rulemaking in the above-captioned proceeding.¹

Omnipoint is the broadband PCS Block A licensee for the New York MTA (call sign KNLF202) and, through its affiliated companies, also holds 18 broadband Block C BTA licenses throughout the country. The Commission's decisions in this proceeding will have a substantial impact on Omnipoint's PCS network and business plans. Therefore, Omnipoint urges the Commission not to establish additional location accuracy requirements and not to mandate interoperability between operators employing incompatible PCS and cellular technologies.

**I. The Commission Should Not Establish
Improved Location Accuracy Requirements**

In its September 3, 1996 Petition for Reconsideration and Clarification (at 15-19) in this proceeding, Omnipoint demonstrated that the Commission's 125 meter location

¹ In the Matter of Revision of the Commission's Rules To Ensure Compatibility with Enhanced 911 Emergency Calling Systems, Report and Order and Further Notice of Proposed Rulemaking, CC Dkt. No. 94-102, RM-8143, FCC 96-264, ¶¶ 133-153 (rel. July 26, 1996) ("ENPRM").

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accuracy requirement² is unlikely to be achieved at reasonable cost given current technological constraints. At ¶¶ 136-143 of the FNPRM, the Commission suggests further tightening of the location accuracy and otherwise improving location reporting information. Omnipoint submits that further location accuracy is not economically or technically feasible at this time and so the Commission should avoid imposition of such regulations.

Omnipoint knows of no current technological way to meet the Commission's suggested 13 meters (40 feet) location accuracy requirement, given current PCS or cellular systems and with the cost, size and weight constraints imposed on handset manufacturers by their customers. While the Commission notes that positioning systems (such as Global Positioning Service,³ other radio positioning systems, and non-radio based systems (*e.g.*, dead reckoning and inertial navigation)) do exist, they do not provide 13 meter accuracy for cellular or PCS handsets. Dead reckoning cannot provide accuracy within 40 feet. Similarly, inertial navigation systems would be impossible in the context of mobile handsets because such systems require continual resetting over a known location point.

Satellite systems cannot provide dependable and accurate information for the CMRS operator to locate users. Satellite systems fail inside buildings, urban canyons, and in other areas without a clear view of the sky. Further, only differential GPS meets

² 47 C.F.R. § 20.18(e).

³ Through differential Global Positioning Service satellite techniques, location accuracy of a few centimeters, or even millimeters, is achievable today. However, without differential correction, the C-Code information available to civilian users of GPS produces an accuracy of 100 meters circular error probability at the 95% probability level. Thirteen meter accuracy with GPS requires a P-Code receiver, which are restricted to US and NATO military users, as well as a few scientific and commercial users. See generally, The Navstar Global Positioning System, Tom Longden, Van Nostrand Reinhold, New York 1992.

the Commission's proposed 13 meter position requirement, but the differential GPS signal is not receivable inside buildings in many areas of the country. While the US Coast Guard's differential system transmits in the 200-400 KHz band at relatively low power, these frequencies are effectively unusable in urban areas. The USCG stations operate with low power (100-200 watts typically) and are sited near the coast. Propagation in built-up areas and inside buildings at these frequencies is poor. Man-made noise is also a significant range limiting factor. Finally, like the Coast Guard systems, the differential GPS correction signal transmitted on a subcarrier frequency by some FM broadcast stations is not necessarily available in all areas of the country.

Non-satellite radio systems do not currently represent a feasible alternative. Such radio systems would have to operate in conjunction with additional specialized services and would require a compatible receiver to be built into each CMRS handset. To implement a non-satellite radio system, the Commission would have to: (a) select an appropriate technology; (b) make spectrum available for it across the country; (c) select licensees; (d) establish a cost recovery mechanism to pay for deployment, maintenance and operation of the systems; (e) retrofit all existing handsets and require that all handsets operate with the selected positioning technology. Such a complicated intrusion into the marketplace would flatly contradict the Commission's deregulatory actions and policies toward CMRS and the customer premises equipment market.⁴

Systems not dependent upon radio, or those that can be updated by radio positioning when a satellite is available, are not cost-effective. For example, dead

⁴ Carter v. AT&T Co., 13 F.C.C.2d 420, recon. denied, 14 F.C.C.2d 571 (1968). See also Computer II Final Decision, 77 F.C.C. 2d 384, 387 (1980) (subsequent history omitted) ("We have repeatedly found that competition in the equipment market has stimulated innovation on the part of both independent suppliers and telephone companies, thereby affording the public a wider range of terminal choices at lower costs. . . . Moreover, this policy has afforded consumers more options to obtaining equipment that best suits their communication or information processing needs.").

reckoning and, inertial systems are bulky and have not been built for hand-held products. Dead-reckoning has no location accuracy; inertial systems have accuracy only within one-mile or one-tenth of a mile, depending on calibration accuracy and frequency of calibration. Further, achieving the desired 13 meter accuracy (including altitude) would be a formidable task to be accomplished for a lightweight consumer-priced handheld dead reckoning or inertial system.

For these reasons, adoption of further location accuracy requirements would impose completely unworkable and technically infeasible regulatory burdens on CMRS operators.

II. The Commission Should Not Mandate Interoperability

The Commission asks, at ¶¶ 144-153 of the FNPRM, whether mobile radio network operators should be required to complete 911 calls "without regard to the availability . . . of the system or technology utilized by their wireless service."⁵ Omnipoint strongly believes that it is neither technologically nor economically feasible for all network operators to serve all possible technology handsets, operating on all possible frequency bands.

The proposed mandatory interoperability would also conflict with the Commission's policies in both cellular and PCS toward market-based interoperability solutions. When the Commission adopted its initial cellular radio rules, it mandated compliance with a specific analog air interface, OST 53, and incorporated that interface specification into its rules.⁶ Since then, the Commission's regulatory philosophy has evolved, first allowing cellular licensees to use certain alternate technologies⁷ and, more

⁵ FNPRM at ¶147.

⁶ See "Cellular Communications Systems," Notice of Inquiry and Notice of Proposed Rulemaking, 78 F.C.C.2d 984, 1002-03 (1980).

⁷ "Liberalization of Technology and Auxiliary Service Offerings in the Domestic Public Cellular Radio Telecommunications Service," Report and Order, GN Dkt. No. 87-

recently, allowing PCS operators a completely open technology choice.⁸ The Commission's evolution of policy recognizes that it serves the public interest far more to permit the efficiencies of the private market, rather than regulatory fiat, to sort out the conflicting technological and economic claims made by manufacturers of various air interface standards. This market-driven policy approach has benefited both consumers and industry with a proliferation of competing and alternative services and equipment.

As a result of the Commission's open technology decisions, PCS operators generally choose among four main technologies:

- GSM-based PCS 1900
- Code Division Multiple Access (CDMA) (ANSI J-STD-008)
- Time Division Multiple Access (TDMA) (up-banded IS-136)
- Omnipoint's hybrid CDMA/TDMA (IS-661)

Two other PCS standards have been proposed, but not yet adopted on any significant scale:

- J-Std-014, a combination of Bellcore WACS and the Japanese Personal Handiphone systems
- IS-665, wideband CDMA.

At 800 MHz cellular frequencies, the following four technologies dominate:

390, 3 FCC Rcd. 7033 (1988), recon. granted in part, Memorandum Opinion and Order, 5 FCC Rcd. 1138 (1990).

⁸ Second Report and Order, GN Dkt. 90-314, 8 FCC Rcd. 7700, 7755 (1993) (FCC's technical PCS rules are guided by the principle "to provide the maximum flexibility in technical standards so as to allow the new service to develop in the most rapid, economically feasible, diverse manner."); Memorandum Opinion and Order, GN Dkt. No. 90-314, 9 FCC Rcd. 4957, 5021-22 (1994) (FCC rejects reconsideration petitions requesting mandatory interoperability standards, preferring to let market forces lead the industry toward interoperability), recon. granted in part, Third Memorandum Opinion and Order, 9 FCC Rcd. 6908 (1994).

- Analog Advanced Mobile Phone Service (AMPS) (originally, IS-3, now replaced by ANSI standard EIA/TIA-553 and TIA interim standard IS-91)
- Narrowband AMPS (originally IS-88, and now incorporated in IS-91)
- TDMA (originally, IS-54; now updated as IS-136, sometimes referred to as Digital AMPS or D-AMPS)
- CDMA (IS-95)

Enhanced SMRS systems (which are also covered in this proceeding and presumably are to be included in any inter-operability rule) use another set of incompatible standards, many of which, if not all, are proprietary, *e.g.*, the frequency hopping technology developed by Geotek.

Each of these competing technologies has certain merits and drawbacks, and the Commission has wisely decided to stay out of the spirited debate over which ones will ultimately be successful in the market place. Having wisely left technology selection to the market place, however, none of the four PCS technologies thus far adopted by network operators are compatible with any other. Omnipoint, as an operator developing both PCS 1900 and IS-661 technology, is well aware of compatibility problems among the various PCS technologies, and notes that solutions are not readily apparent.

Given the current plethora of incompatible technologies, the Commission would need to embark on a largely unworkable plan to achieve its suggested requirement for access to 911 service via multiple mobile systems. In Omnipoint's view, the Commission would be forced to take one of two approaches for interoperability among the various technologies:

1. Adopt a common, default air interface standard, requiring:
 - a) Each handset to support the default standard in addition to any other standards; and

- b) Each base station to support the default standard in addition to any other standard.
2. Support multiple modes, requiring either:
- a) Intelligent Handset—The handset searches for a network supporting its preferred mode. If none is found, it searches for other networks and conforms to the standard of the other network; or
 - b) Intelligent Base Station—The handset searches for a network supporting its operational technology. If no network is found, it transmits a request for service using its technology. A base station receives the signal and communicates with the handset's preferred technology.

In addition, either approach would require the Commission to adopt a cost recovery mechanism to reimburse operators for alteration of their networks and subscriber equipment.

Merely stating these alternatives itself illuminates the enormous technical, economic and regulatory problems that render them unlikely to occur. Some problems include:

- *How are existing handsets to be accommodated?* The vast majority of existing handsets are 800 MHz AMPS compatible. If these handsets are to be supported, then only option 1(b) or 2(b), above, with analog AMPS as the default standard are viable.
- *Will consumers accept the greatly increased price that must be charged for dual-mode operation?* Some handsets are today capable of dual-mode operation. All 800 MHz CDMA, TDMA and NAMPS handsets retain analog AMPS capability. Further, it appears that some multi-frequency handsets will be available that permit operation at 800 MHz cellular and 1900 MHz PCS frequencies, where compatible modulation techniques are used, e.g., CDMA. These handsets carry both a cost and size premium over single band or single mode handsets, and it is dubious that consumers will

readily accept the increased prices for these more sophisticated handsets in the absence of a clearly perceived countervailing benefit.

- *Can handset manufacturers justify the additional cost and complexity in handset development?* Technologies such as IS-661 may be implemented as a capacity overlay in high demand portions of a PCS-1900 network, which already requires dual-mode handsets. To add yet another mode and frequency band will result in a major increase in handset complexity and price. Further, the additional 800 MHz AMPS components, particularly the duplexer, will increase handset size significantly.
- *Is the technology for the software-defined handset and the software-defined base station available?* Despite claims by certain prospective suppliers, the software-defined handset and the software-defined base station, which are necessary to even partially implement options 2(a) or (b), above, are not available and are unlikely to be available in the next few years. Discussions with one international handset manufacturer suggests the "software handset" is at least 10 years away and whether such a product would be price-competitive with specialized single-mode handsets is uncertain. Further, even if a software-defined base station is produced, and it is capable of operation on any one of the popular communications modes, the rest of the network must also be compatible with all modes. With only limited exception (*e.g.*, the IS-661 base station is intended to look to the network like a standard PCS-1900 base station), the messaging and data flows between the base station and the mobile switching center, home location register, and other major network elements of a PCS or cellular system are highly specific to the particular communications standard used. Further complicating this equation is the fact that infrastructure suppliers use proprietary internal network protocols and not all infrastructure suppliers support all technologies. For example, a cellular network with Ericsson infrastructure cannot add compatible CDMA infrastructure, as Ericsson does not offer it. A second,

overlay CDMA network would be necessary -- a very expensive proposition only to support occasional 911 calls.

- *How are network operators to be compensated for increased costs?* If the multiple technology support is to be used only for 911 calls by non-subscribers, an operator simply cannot justify the increased network expense. Likewise, local and state governments are unlikely to pay for the necessary network changes.
- *From a regulatory perspective, how does the Commission plan to deal with radio interference management issues when PCS operators receive and transmit in cellular spectrum, and vice-versa?* A host of related regulatory problems are likely to arise.
- *How does an operator in one service provide the expected service quality for a subscriber of another service?* There are major differences in coverage between the cellular and PCS frequency bands such that an operator with a network designed for one would be unlikely to provide comparable coverage for the other. For example, it is not unreasonable to achieve 15 km coverage in rural areas with 800 MHz cellular systems. The same antenna site might yield only 8 km coverage at PCS frequencies.
- *Will the owners of the intellectual property rights covering certain proprietary systems be forced to disclose their technology and grant licenses to any other equipment manufacturer? How will such owners be compensated?*
- *How are network options for speech coding to be accommodated?* Some air interface standards give the network operator certain options for speech coding. For example, Omnipoint's IS-661 defines a data transmission protocol capable of supporting a variety of speech coders. This adds another layer of complexity to mandating interoperability among inherently incompatible technologies.

Similarly, Omnipoint believes that the Commission should not dictate to the consumer the use of its marginal dollars in handset purchases. Instead, consumers can make individual decisions to choose more expensive dual-mode handsets that can further

protect their ability to connect to E911. Consumers that intend to travel extensively, for example, including areas where PCS service may not be available, and who want mobile telephone service can select an appropriate operator and technology. By contrast, other consumers may judge their travel plans differently and seldom leave the coverage of an urban PCS system. They, too, are capable of making rational selections from among the various cellular and PCS offerings and opt for less expensive mobile communications equipment.

For these reasons, Omnipoint submits that the Commission should not adopt interoperability rules for PCS and cellular systems.

Respectfully submitted,

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